



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/GB94/00984 <b>(22) International Filing Date:</b> 6 May 1994 (06.05.94) <b>(30) Priority Data:</b> 9309355.7      6 May 1993 (06.05.93)      GB <b>(71) Applicant (for all designated States except US):</b> DATESAND LIMITED [GB/GB]; 2 Ferndale Road, Brooklands, Cheshire M33 3GP (GB). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> WOODS, Barry, Moseley [GB/GB]; 2 Ferndale Road, Brooklands, Cheshire M33 3GP (GB). <b>(74) Agents:</b> GOODWIN, Mark et al.; Wilson Gunn M'Caw & Co., 41-51 Royal Exchange, Cross Street, Manchester M2 7BD (GB).		<b>(81) Designated States:</b> AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KG, KP, KR, KZ, LK, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> ABSORBENT MATERIAL <b>(57) Abstract</b> <p>An absorbent material (10) comprising a semi-permeable membrane (11), a backing layer (13) and an absorbent polymer (14) therebetween. The edges of the material are sealed. The material has particular application as a cloth for absorbing blood, chemicals and the like or as a reservoir for water and nutrients for plants.</p> <div data-bbox="508 1150 1377 1367"> </div>		

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ABSORBENT MATERIAL

The present invention relates to an absorbent material.

It is known to produce absorbent materials comprising a non-woven fabric and a semi-permeable membrane. This material is generally sold in 1m or 2m wide sheets. Any absorbed product may pass out through the edges of the material as the edges are not sealed.

According to a first aspect of the present invention there is provided the use of an absorbent material as a reservoir for fluid and/or nutrients for plants, said absorbent material comprising a semi-permeable membrane and a backing layer, an absorbent polymer being provided in the material. The edges of the material are preferably sealed.

According to a second aspect of the present invention there is provided a container, the walls of said container being made from an absorbent material comprising a semi-permeable membrane and a backing layer, an absorbent polymer being provided in the material, wherein the edge of the material is sealed.

According to a third aspect of the present invention there is provided the use of an absorbent material in the absorption of blood, water, water based chemicals or oils, said absorbent material comprising a semi-permeable membrane

and a backing layer, an absorbent polymer being provided in the material, wherein the edge of the material is sealed.

By sealing the material at the back and edges the leakage of polymer flakes, saturated polymer and non-woven material is avoided. Thus any absorbed harmful fluids or chemicals are entrapped in the material. Similarly polymer flakes comprising water or nutrients for plants are not lost. The edges of the material may be sealed with an impermeable fabric, preferably using a stitch bespoke design. This fabric may be woven. The edges need not necessarily be sealed by stitching. Heat sealable materials could be used in order to facilitate heat sealing. Heat treatment such as heat-sealing or fusing, stitching, adhesives, adhesive tapes, sealants may all be used to seal the edges of the material. The material of the invention can be made to any suitable shape or size.

The material may comprise a non-woven layer. The non-woven layer preferably comprises polymeric fibres such as cellulose fibres. Preferably a super absorbent polymer is used. The absorbent polymer may be integrated into the non-woven layer or alternatively may be present as a separate layer. The absorbent polymer is preferably particulate. The selected polymer would depend upon the end use of the material. Example uses include the absorption of one or more of the following: blood, water, water based chemicals or oils. The material generally has an absorption capacity of 20 to 30 litres per square metre. The backing layer is preferably made

from plastics material.

The material of the present invention has many different applications and uses. In addition to being used to soak up blood, chemicals and the like it can act as a reservoir of water and nutrients to be supplied to plants.

In the health care field it is common practice to soak up spillages by sprinkling absorbent polymer onto the spillage, wait for absorption to take place and then brush up the saturated material. This procedure is inefficient. Absorbent material in accordance with the present invention can be placed over the spillage in order to absorb all of the spillage. One or more handles may be provided in order to prevent contact of the user with the spilled fluid. Furthermore the spilled fluid can be isolated within the absorbent material so as to prevent contamination. One or more disinfectants can be incorporated into the absorbent material if required.

A further application in the medical field is in the transportation of sample/specimen containers. Medical specimens are currently transported via the postal services using a variety of devices and packaging products to prevent the specimen container from being broken. The specimen must be wrapped in an absorbent material which is placed in a leak proof plastics bag or sealed box.

The material of the present invention may be formed into a suitable container either in box or envelope form. The plastics backing layer of the material would form the outer surface of the container. It is considered that such an integrated package would provide significantly better protection for both the package itself and any spillage that may occur. However, a further protective layer such as a plastics material comprising air pockets may be used. This material is commonly referred to as bubble wrap. An inspection window may be provided in the container.

As previously stated the absorbent material may be used as a reservoir for fluid/water and or nutrients. A different polymer would generally be used to that used in the medical applications described above. Thus in arid soils water can be directed onto the target areas where mats or bags are placed which are made from the absorbent material in accordance with the present invention. Thus the absorbent material will lead to considerable savings in water consumption and improved crop yields per acre. The mats of the present invention can also be used for hanging baskets, plant pots, window boxes and like containers either in or under such containers and for wrapping around root complexes during transportation of plants. The mats of the invention provide water to ensure survival of the plants for protracted periods such as during vacations, transport of plants and in long standing displays.

The invention also has application in seed cultivation mats which allow growth of seed and root complexes. Such mats allow the total seed/plant and root complexes to be cut out and avoids root disturbance. The seeds or plants can then be transported in the original growing medium without disturbing root formations. The mats may also be used to provide a medium for grasses or plants to achieve natural results indoors or outdoors as desired to provide improved quality growth and avoid effects of wildlife e.g. turf cultivation.

Biodegradable materials may be used in order to ensure that the product would decompose over a suitable time period. In particular a biodegradable backing material is preferred.

The polymer used in the absorbent material could be chosen to suit the particular end use. For example, in horticultural mats polyacrylates are preferred whereas in mats used for absorbing chemicals cross-linked polyacrylamides or polyacrylates are preferred.

In order that the present invention may be more readily understood specific embodiments will be described by way of example only with reference to the accompanying drawings in which:-

Fig.1 is an exploded view of an absorbent material for use in any of the aspects of the present invention;

Fig.2 is a perspective view of the absorbent material of Fig.1;

Fig.3 shows an envelope container for transporting medical samples, the container being made from the absorbent material of Figs. 1 and 2;

Fig.4 shows a box container for transporting medical samples, the container being made from the absorbent material of Figs. 1 and 2;

Fig.5 is an absorbent mat made from the materials of Figs. 1 and 2; and

Fig.6 shows a bag made from the absorbent material of Figs. 1 and 2, the bag being used as a water and nutrient reservoir for a plant.

Referring to Figs. 1 and 2 an absorbent material 10 has a layered structure comprising a semi-permeable top cover 11, a non-woven cellulose fabric 12, a layer of particulate super absorbent polymer 13 and a plastics base sheet 14. The super absorbent polymer can alternatively or additionally be integrated into the cellulose fabric. The choice of polymer for incorporation into the material would depend upon the end use of the material. Super absorbent polymers are available, for example, for absorbing blood, water based chemicals or oils.



During manufacture edging strips 15 made from an impermeable material are located around the four edges of the material and are sealed.

Fig.3 shows an envelope 16 for transporting a specimen jar. The envelope is made from two pieces of the material shown in Fig.1. The width of the two pieces of material is the same, but one piece of material is longer than the other so as to provide a flap 17. During manufacture the plastics backing sheets of the two pieces of material are placed back to back and the pieces of material are connected together by a line of sewing around the edges thereof. The envelope is then turned inside out such that the plastics backing sheet is provided on the outside of the envelope. The envelope is operative to receive a Specitran (trade mark) specimen jar 18 in the pouch of the envelope. The flap 17 is then inserted inside the pouch 19 to seal the envelope, additional securing means being provided for securing the flap 17 in place. It is noted that impermeable edging strip is required at the connected regions of the pieces of material. However, impermeable edging strip may be provided around the flap 17 and the open edge 20 defining the top of the pouch 19.

An additional protective layer 21 may be provided around the outside of the envelope. This may be a plastics material comprising air pockets such as material commonly referred to as bubble wrap.

Fig.4 shows a box 22 for transporting specimen jars made from the material in accordance with the invention. The box may comprise an additional layer to provide it with sufficient rigidity.

Ideally the polymers for incorporation into the specimen carriers of Figs. 3 and 4 would be capable of absorbing at least 7 litres per square metre of material and preferably up to 18 litres per square metre of material.

Fig.5 shows an absorbent mat 23 which comprises a piece of material as shown in Fig.2. However, handles 24 are provided on the rear non-absorbent surface of the mat so that the user need not touch the spilled fluid 25. Disinfectants may optionally be incorporated into the mat.

The absorbent polymers used in the specimen covers of Figs. 3 and 4 would be appropriate here also. Suitable polymers for absorbing aqueous based chemicals include cross-linked polyacrylamides and sodium polyacrylates.

Fig.6 shows a bag 26 made from the material of Fig.1. An impermeable edging strip is provided around the free edge 27 of the bag. The material comprises an absorbent polymer which is charged with water. The polymer ideally comprises a highly cross-linked potassium polyacrylate absorbent polymer. The bag is also charged with nutrient material. In use a plant is located in the bag and the neck of the bag is

tied around the plant stem by a bag tie 28. The bag is useful when planting plants in arid soils and when transporting plants. Absorbent capacities of at least 20 litres of water per square metre are achievable.

The absorbent material may also be used to provide water and/or nutrients in a hanging basket or other plant container. The mat could be located in the container substantially one third of the way up the container; i.e. at root level. Alternatively the mat could be located under the pot. The plant roots grow into the mat and take water nutrient on a by-demand basis. Mats may alternatively be placed in trenches in arid soils and then covered with soil. The mats provide impermeable undersoil reservoir mats. The mats may also be used for cultivating seeds. The root complexes could then be transferred to turf/lawns, seed trays, herbs etc.

Nutrients could be provided in the mat. Water could be added to the mat. The mat quickly absorbs large volumes of water (20 litres per M<sup>2</sup>). The mat could be topped up with water as required once in use.

It is to be understood that the above described embodiment has been made by way of illustration only. Many modifications and variations are possible.

Claims

1. The use of an absorbent material as a reservoir for fluid and/or nutrients for plants, said absorbent material comprising a semi-permeable membrane and a backing layer, an absorbent polymer being provided in the material.
2. The use as claimed in claim 1, wherein the edges of the absorbent material are sealed.
3. The use as claimed in claim 1 or claim 2, wherein an impermeable fabric is provided at the edges.
4. The use as claimed in any preceding claim, wherein the edges are sealed by heat treatment.
5. The use as claimed in any preceding claim, wherein said material further comprises a layer of non-woven material.
6. The use as claimed in claim 5, wherein the polymer is incorporated into the non-woven layer.
7. The use as claimed in claim 5, wherein the polymer is not incorporated into the non-woven layer.
8. The use as claimed in any preceding claim, wherein the material has an absorption capacity of 20 to 30 litres per square metre.

9. The use as claimed in any preceding claim, wherein at least a part of the absorbent material is biodegradable.

10. A container, the walls of said container being made from an absorbent material comprising a semi-permeable membrane and a backing layer, an absorbent polymer being provided in the material, wherein the edges of the material is sealed.

11. A container as claimed in claim 10, wherein an impermeable fabric is provided at the edges.

12. A container as claimed in claim 10 or claim 11, wherein the edges are sealed by heat treatment.

13. A container as claimed in any of claims 10 to 12, wherein said material further comprises a layer of non-woven material.

14. A container as claimed in claim 13, wherein the polymer is incorporated into the non-woven layer.

15. A container as claimed in claim 13, wherein the polymer is not incorporated into the non-woven layer.

16. A container as claimed in any of claims 10 to 15, wherein the material has an absorption capacity of 20 to 30 litres per square metre.

17. A container as claimed in any of claims 10 to 16, wherein

at least one handle is attached to the material.

18. A container as claimed in any of claims 10 to 17, wherein the material is formed into a closable container.

19. A container as claimed in claim 18, wherein the semi-permeable membrane is provided at the inside of the container.

20. A container as claimed in claim 17 or claim 18, wherein an outer protective layer is provided around the container.

21. A container as claimed in any of claims 17 to 20, wherein an inspection window is provided in the container.

22. The use of the container defined in any of claims 17 to 20 for the transportation and/or storage of a vessel carrying a sample or specimen.

23. The use of an absorbent material in the absorption of blood, water, water based chemicals or oils, said absorbent material comprising a semi-permeable membrane and a backing layer, an absorbent polymer being provided in the material, wherein the edge of the material is sealed.

24. The use as claimed in claim 23, wherein an impermeable fabric is provided at the edges.

25. The use as claimed in claim 23 or claim 24, wherein the

edges are sealed by heat treatment.

26. The use as claimed in any of claims 23 to 25, wherein said material further comprises a layer of non-woven material.

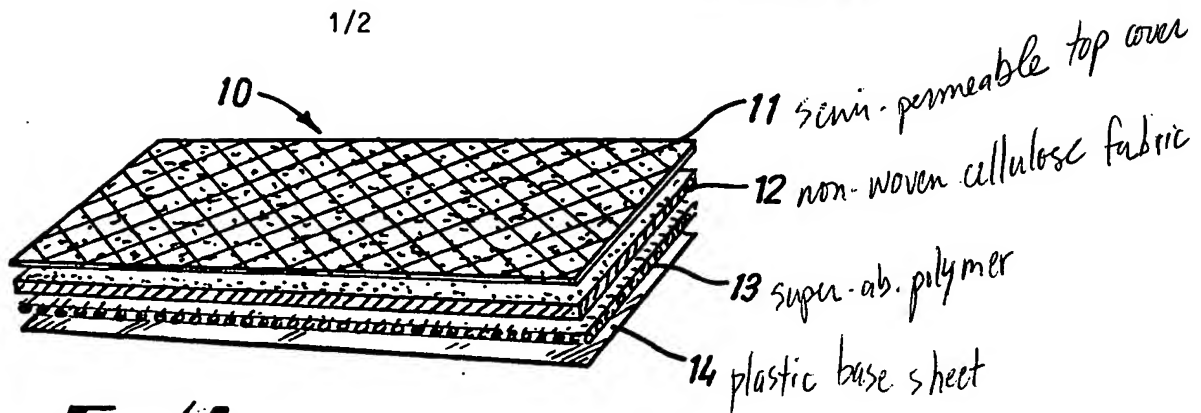
27. The use as claimed in claim 26, wherein the polymer is incorporated into the non-woven layer.

28. The use as claimed in claim 26, wherein the polymer is not incorporated into the non-woven layer.

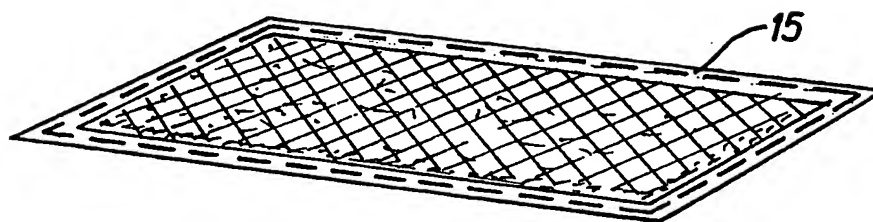
29. The use as claimed in any of claims 23 to 28, wherein the material has an absorption capacity of 20 to 30 litres per square metre.

30. The use as claimed in any of claims 23 to 28, wherein at least one handle is attached to the material.

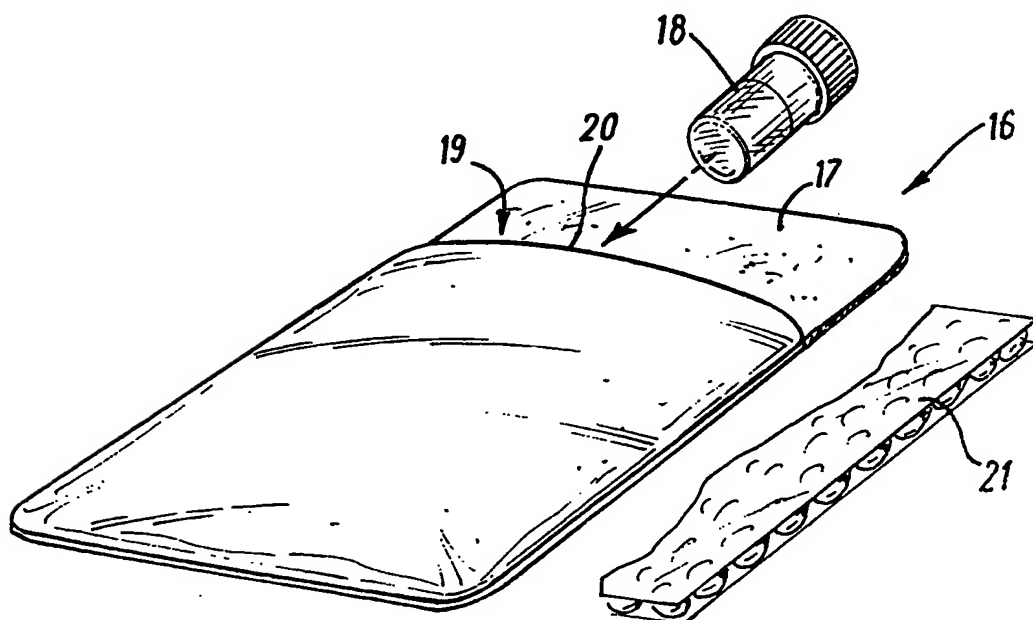
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**FIG. 1**



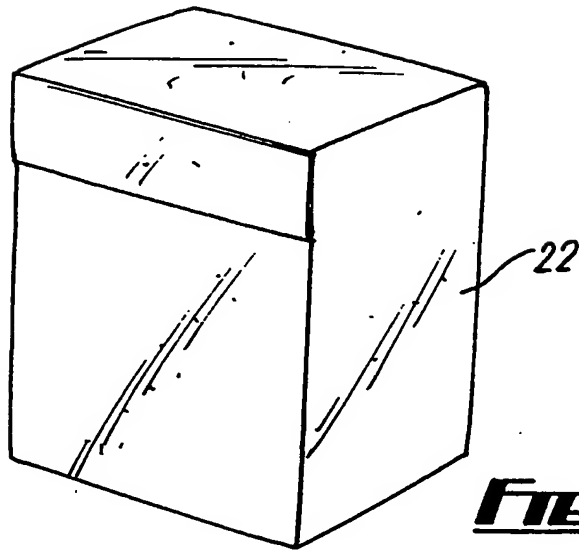
**FIG. 2**



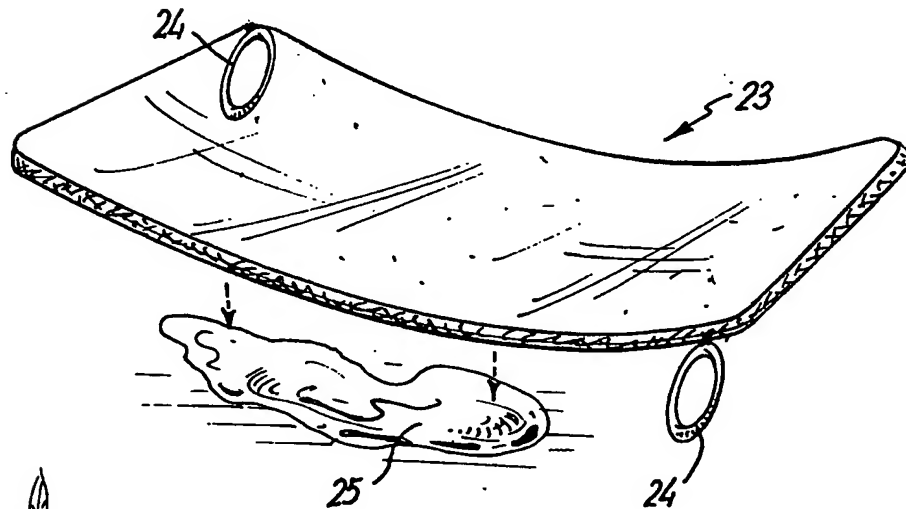
**FIG. 3**



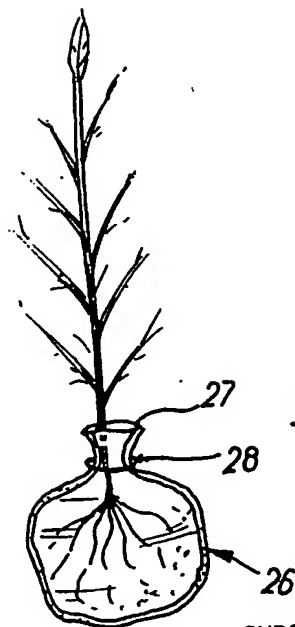
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**FIG. 4**



**FIG. 5**



**FIG. 6**

SUBSTITUTE SHEET (RULE 26)

## INTERNATIONAL SEARCH REPORT

Internat. Application No

PCT/GB 94/00984

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 A01G9/10 B65D81/26

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 A01G B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 230 799 (BEGHIN-SAY) 5 August 1987  see page 3, line 7 - page 5, line 58; figures 1-8 see claim 11  ----	1-9, 23-29
X	FR,A,2 630 293 (KAYSERBERG) 27 October 1989  see page 3, line 22 - page 4, line 31; figures 1-3  ----	1,2,4,5, 7,9,23, 25
X	EP,A,0 368 007 (RUSSO) 16 May 1990  see column 13, line 8 - column 15, line 37; figures 1-6  ----	10-14, 18,19, 22-27
Y	----- -/--	20,21

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

19 August 1994

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05.09.94

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	BE,A,666 885 (FIRMA PAPIERWERK PAUL REUTER) 3 November 1965 see page 5, paragraph 3; figure 1 ----	21
Y	US,A,4 984 907 (POWER) 15 January 1991 see column 3, line 15 - line 21; figure 3 -----	20

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Information on patent family members

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